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Pupils' Gender and Mathematics Achievement in Ibadan Metropolis, Oyo State

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ABSTRACT :

This study sought to examine the difference in mathematics achievement between learners of both genders in public primary schools in Ibadan Metropolis, as available studies have differing results. The study provides much-needed data from primary schools, as many of the accessible studies focus on learners in secondary schools, enabling gender-balanced teaching. A causal-comparative research design was used for this study. The study was carried out over a period of nine weeks, and an achievement test (P3MAT) was administered to all classes at the start and end. Ibadan Metropolis has 11 Local Government Areas (L.G.A.s) with 929 public primary schools. The study population included all Primary Three pupils in public primary schools in Ibadan Metropolis. Simple random sampling was used repeatedly to select three schools from three L.G.A.s. The study used intact classes. Data were analysed using Analysis of Covariance (ANCOVA). Results showed that male pupils had a mean score of 9.95 (SD = 2.934), while female pupils had a mean score of 9.96 (SD = 2.495). After controlling for prior achievement, there was no significant difference in mathematics achievement between male and female primary school pupils in Ibadan Metropolis, Oyo State ($F_{(1,42)} = 0.091$, $p > 0.05$, partial $\eta^2 = 0.002$, Adj $R^2 = 0.332$).

Keywords: Gender, Mathematics Achievement, Pupils, Ibadan Metropolis

Introduction

1.1 Background of the study

Mathematics is a core subject in preschool, primary, and secondary schools around the world, as education is a recognised right for every individual. It is the foundation for, and is required for, advancement in Science, Technology, Engineering, and Mathematics (STEM) fields. Mathematics touches every field in which human beings are involved (Tella & Olapade, 2024). Even people who do not attend formal schools still need mathematical concepts to perform their enterprise, as numeracy has a place in every subject and field. The mixing of colours in art is Mathematics; blue plus yellow gives green; and in sports, experts calculate the trajectory of a ball. The farmer must calculate the space between seeds to give his crops space to thrive; the market trader must be able to do basic mathematics to prosper in business; the baker must measure his ingredients to produce a supple cake; and the lumberman must gauge the direction in which the tree will fall when he is cutting down a tree. There will be no economic growth without education being at the forefront, and that is why countries that have not made education a priority lag behind on the world stage (Okpara E.U., & Ajaero H., 2023). With technological advancements and the speed at which knowledge is acquired every day, Mathematics can no longer be seen through the eyes of former years, in which teachers take the centre stage, attempting to force knowledge down pupils' throats. Pupils need to be encouraged to be active participants, taught to think deeply, and solve problems creatively in order to navigate daily life, contribute to nation-building, thrive in the workplace in later years, and leave their mark.

In both the formal and informal sectors, Mathematics is taught in stages, with one stage setting the foundation for the next. With this in mind, it is paramount that a solid foundation in Mathematics is laid in early childhood education with the first teachers, who are the parents or guardians at home. By the time the child begins preschool, the baton is passed on to the teachers, and because children spend a good part of their day in the school environment, it only makes sense that the teacher helps the child navigate the exploration of his world and supply the needed knowledge. Both the Sustainable Development Goals and the objectives of Universal Basic Education in Nigeria have it as a central focus that the Nigerian child needs to be well educated regardless of gender, socio-economic background, or any other factor (Njoku, M., (2017).

Every teacher wants their pupils to perform well, so when this does not go as planned, it is imperative to investigate the cause(s) and develop effective solutions. Gender has been debated for years as a variable that may affect pupils' mathematics achievement (F. Reinhold *et al.*, 2026). Children starting in school at a relatively mature age have about the same outlook and attitude toward the mathematics classroom; thus, they perform on equal footing (Davey R. *et al.*, 2026). Ibadan, being a large city, has many public primary schools which are mostly coeducational, with boys and girls being taught and tested in the same way. Data from the Ministry of Education's Education Management Information System (EMIS) showed that in the 2024/2025 academic session (with a reporting rate of 77.2%), of the 2,400,383 primary school pupils in Oyo State, 1,241,102 were female while 1,159,281 were male. This shows that there was a difference of 81,821 pupils, with females being higher, in the enrollment rate of the pupils, which cannot be

discounted, as the number amounts to approximately 3.41% of the total enrollment population. It has been found that girls do a lot better in mathematics than boys in many countries; however, in some of these countries, the enrollment rate for girls is lower than that of their male counterparts (Hafeez A. & Xenofontos C., 2024).

1.2 Review of literature

There are some results indicating that there are still gender disparities. This is often influenced by a variety of sociocultural, religious, economic, educational, and psychological factors. Boys performed well ahead of girls in a study on early mathematics achievement carried out in Australia on eight- and nine-year-olds, even though girls seemed to be able to pay attention for much longer (Williams, 2016). One aspect of the gender gap in Mathematics that has received less attention is how learners are taught the subject. Based on qualitative research, the gender gap in Mathematics might close or even vanish when the teaching approach is problem-solving orientated, and the students participate in discussions and exploratory exercises in low-pressure settings (Tommaso *et al.*, 2024). Another study examined 29 foreign and domestic datasets, totalling 9,471,692 students from 1,456 areas. After adjusting for general reading proficiency, the results revealed a gender gap in arithmetic proficiency of more than 0.76 (Cohen's d), favouring males for each dataset. In the 2018 Programme for International Student Assessment (PISA 2018), the gender gap in Mathematics achievement favouring boys was greater than 0.35 in each area, with a mean of 0.70 for 79 countries or jurisdictions after adjusting for general reading achievement (Yu, *et al.*, 2023). A study in Northern Province, Rwanda examined the impact of gender differences on students' performance in Mathematics. The results revealed that girls scored better in Mathematics than boys. In the Mathematics test, girls achieved an average of 12.42 while boys scored an average of 10.82 (Muhawenimana *et al.*, 2023). The analysis of data from other studies revealed that male students outperformed female students in mathematics. Additionally, male students were better at remembering mathematical concepts than female students (Okpara *et al.*, 2023 & Okpe *et al.*, 2022).

On the other hand, a study undertaken by Tella A. & Olapade K., (2024) in Ibadan concluded that gender had no significant effect on primary school pupils' mathematics achievement. The same was seen in a study carried out in Iseyin Local Government Area of Oyo State, which concluded that there was no discernible difference between male and female learners' achievement in Mathematics (Olanrewaju *et al.*, 2024). Yet another study done in Ghana encompassing Primary 3, 4, and 6 pupils concluded that gender had no effect, even though the boys in the final class, Primary 6, performed significantly better than the girls (Wilmot, 2001). Could it be that as children advance, some differences begin to emerge between the genders in their mathematics achievement? Gender gaps do exist, even though slight, with boys at the upper end, and this gap continues to widen as the pupils move to higher classes (Zawistowska, 2013). Okpara & Ajaero (2023) concluded from their study that gender does have a significant effect on learners' mathematics achievement. However, the research was carried out on secondary school students. According to Rodríguez *et al.* (2020), while gender has no significant effect on the mathematics achievement of boys and girls, each gender is motivated differently, with girls seemingly less motivated towards mathematics and appearing to be more anxious about it. Two other studies concluded that there was no discernible difference between male and female students in terms of their relative academic achievement (Ahmed, 2024 and Escudero, 2022). These studies are pointing to the same conclusion, which is that gender does not affect Mathematics achievement.

1.3 Statement of the Problem

Mathematics is the bedrock for numeracy and other subjects which produce an individual who is equipped with the skills needed in Nigeria's rapidly changing technological climate, however, achievement in mathematics at the primary level is still giving concern (Bamidele A., 2026). The scores from the pilot study carried out prior to this study gave credence to the outcry over pupils' average performance in mathematics despite having items from their regularly used textbook.

It has been suggested that gender may have a role to play and this has been debated on for some time with some studies favoring a difference between the achievement of the genders, while others reported no significant difference (Williams, 2016), (Tella A. & Olapade K., 2024).

It is note-worthy that research has been inconclusive about the difference of gender in primary school pupils' Mathematics achievement in Ibadan Metropolis, as there is limited data from primary schools to gain clarity on this matter. Many of the accessible studies focus on learners in secondary schools and tertiary institutions, leaving data-seekers groping in the dark for needed information (Okpara & Ajaero 2023). There is a need to scientifically bring about a conclusion as without this, pupils will continue to struggle needlessly, and teachers will continue to be at a loss as to why their pupils are not meeting up. Suitable data bring about the possibility of that curriculum and policies will need to be restructured in such a way that no one is left behind. This is why this study seeks to present data in a bid to conclude on the difference of gender in primary school pupils' mathematics achievement in Ibadan Metropolis, Oyo State.

1.4 Purpose of the Study

The main aim of this study was to examine the difference in mathematics achievement between learners of both genders in public primary schools in Ibadan Metropolis, Oyo State.

1.5 Research question

Is there a significant difference in posttest mathematics achievement of male and female primary school pupils in Ibadan Metropolis, Oyo State?

1.6 Hypothesis

There is no significant difference in mathematics achievement of male and female primary school pupils in Ibadan Metropolis, Oyo State.

1.7 Significance of the Study

The findings of this study will be significant to multiple stakeholders:

1. To the Oyo State Ministry of Education: Evidence-driven data will inform gender-responsive policies and interventions under the State Universal Basic Education Board (SUBEB) to close the gaps in Mathematics achievement between the genders.
2. To Parents and the community: An awareness of the role that gender may play in Mathematics achievement can generate the needed support for children of both genders and reduce comparison and other demoralising patterns.
3. To researchers: The study will contribute to the limited literature available on gender and mathematics achievement in public primary schools in Oyo State and, in particular, Ibadan Metropolis.

2. Methodology

2.1 Research design

A causal-comparative research design was used for this study. The design was considered appropriate because gender is an attribute that cannot be manipulated. To further remove any instance of manipulation intact classes were used, thus enabling the comparison of mathematical achievement between unaltered groups. The study was carried out over a period of nine weeks without any intervention. A posttest was administered to all classes at the end.

2.2 Population and sample

Ibadan metropolitan area has eleven local governments, including five urban local governments and six semi-urban Local Government Areas (Ibadan Urban Flood Management Project, 2022). The population of the study included all Primary Three public primary school pupils in Ibadan metropolis. Primary three learners were selected because they are the peak of the early childhood bracket of birth to 8years. Sampling was done using a multi-stage sampling procedure: one Local Government Area (L.G.A.) was selected from the five urban L.G.A.s, while two were selected from the six semi-urban L.G.A.s, giving rise to three L.G.A.s using simple random sampling. This was done because the five urban L.G.A.s have 336 public primary schools, while the six semi-urban L.G.A.s have 593 public primary schools, a difference of 257 schools. From the three L.G.A.s, one school was selected per L.G.A also using simple random sampling, giving a total of three schools with intact classes which were used for the study.

2.3 Research Instrument

The research instrument used for this study was the Mathematics Achievement Test (MAT), which included two sections: (A) which carried the personal data (Name, age, gender, L.G.A. of the school), and (B) which was the actual test and was made up of 15 multiple-choice items with options (a)–(d). A mark was given per item.

2.4 Validity of the Research Instrument

Content and face validity were carried out by lecturers from the Department of Arts and Social Science Education of the Lead City University, Ibadan, comparing the items with the intended results to ensure appropriateness.

2.5 Reliability of the Research Instrument

The instruments in this study were subjected to a trial test involving 26 learners who were not part of the sample. Internal reliability for the Mathematics Achievement Test was assessed using Kuder-Richardson's KR-20 formula.

2.6 Method of Data Collection

Permission to carry out the pretest-posttest was gotten from the appropriate authorities. The Primary Three class teachers were instructed on the purpose of the study and the procedure for conducting the tests. The test was administered in the first week by the researcher to serve as the covariate in all three schools, and this included the filling of Section A (Biodata). The Mathematics Achievement Test was completed within 20-30 minutes to reduce interruption of normal classes. The test was re-administered, serving as the dependent variable, after seven weeks, with the items rearranged and some wording and figures altered to control for practice effect.

2.7 Method of Data Analysis

The data collected from the Mathematics Achievement Test were summarised using descriptive statistics. Analysis of Covariance (ANCOVA) was conducted to compare the adjusted mathematics achievement of pupils of both genders after controlling for prior achievement (pretest), and it was used to test the hypothesis at the 0.05 level of significance.

3. RESULT

3.1 Research Question

Is there a significant difference in posttest mathematics achievement of male and female primary school pupils in Ibadan Metropolis, Oyo State?

Table 1 - Descriptive Statistics of Pupils' Mathematics Achievement by Gender

Gender of Pupils	Mean	Std. Deviation	N
Male	9.95	2.934	19
Female	9.96	2.495	23
Total	9.95	2.668	42

Source: Field work (2025)

Results in Table 1 show that male pupils had a mean score of 9.95 (SD = 2.934) while female pupils had a mean score of 9.96 (SD = 2.495).

4.2 Hypothesis

There is no significant difference in mathematics achievement of male and female primary school pupils in Ibadan Metropolis, Oyo State.

To test this hypothesis, ANCOVA was conducted with the posttest as the dependent variable, gender as the independent variable, and the prior Mathematical Achievement Test (pretest) as the covariate. The results are presented in Table 2.

Table 2 - ANCOVA Table Showing Pupils' Mathematical Achievement by Gender with Pretest as Covariate

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	106.378 ^a	2	53.189	11.181	.000	.364
Intercept	63.323	1	63.323	13.311	.001	.254
Pretest	106.377	1	106.377	22.362	.000	.364
Gender	.433	1	.433	.091	.765	.002
Error	185.527	39	4.757			
Total	4452.000	42				
Corrected Total	291.905	41				

Note: R Squared = .364 (Adjusted R Squared = .332)

Source: Fieldwork (2025)

The results of Table 2 show that there is no significant difference in mathematics achievement of male and female primary school pupils in Ibadan Metropolis, Oyo State after controlling for prior achievement ($F_{(1,42)} = 0.091$, $p > 0.05$, partial $\eta^2 = 0.002$, Adj $R^2 = 0.332$). This gives grounds for retaining the null hypothesis. This implies that gender does not significantly influence pupils' mathematics achievement in Ibadan Metropolis.

5. Discussion of Finding, Conclusion and Recommendations

5.1 Discussion of finding

The hypothesis which states that there was no significant difference in mathematics achievement of male and female primary school pupils in Ibadan Metropolis, Oyo State was tested using Analysis of Covariance. The result revealed that there was no significant difference in the mathematics achievement of male and female Primary three pupils after controlling for prior achievement, ($F_{(1,42)} = 0.091$, $p > 0.05$, partial $\eta^2 = 0.002$, Adj $R^2 = 0.332$). Based on the result, the null hypothesis could not be rejected. The finding implies that gender is not a determinant of the mathematics achievement of public-school pupils in Primary three in Ibadan Metropolis. The results suggests that there is equal capacity for pupils of both genders to learn and achieve optimally in Mathematics when given an equal footing and when differences in prior knowledge are statistically controlled.

The finding of this study is in line with the findings of Wilmot (2001), and Rodriguez *et al.* (2020) who in their studies analysed reported that data analysed had no significant gender difference. Similarly, Tella (2024) and Olapade & Olanrewaju (2024), in the Nigerian contexts, also found no significant difference between the different ends in mathematics achievement. These authors attributed the similarity in performance to equal treatment and instruction by teachers, especially at the primary level of education, equal access to educational resources.

However, the findings contradict the findings of Williams (2016), Yu (2023), and Okpara (2023) who reported that male pupils significantly performed better than female pupils in mathematics and that of Muhawenimana (2023) who reported that females performed better. The discrepancies may be attributed to cultural contexts, class level, instructional methods and sample characteristics used in the studies. As Hafeez (2024) pointed out, some societies may discourage female children from mathematics leading to low self-efficacy and thus poor achievement. Ibadan is a more gender- neutral society and thus this sort of discrimination is not likely to be at play.

The implication of this is that teachers must come into the classroom with an unbiased approach to teacher regardless of what society believes and give all pupils equal opportunities to learn, make choices, compete, and express themselves. Since gender has been shown not to account for mathematics achievement other factors that affect achievement are teachers' lesson preparation and delivery, pedagogy, learning environment/infrastructure, utilisation of instructional materials, classroom management, mastery of the subject matter, evaluation of learning outcomes, Information and Technology use, teachers' attitude, perceptions, passion, training, qualification, and experience (Osiesi, 2020).

5.2 Conclusion

In conclusion, this study has shown that both genders of Primary three pupils in Ibadan Metropolis are on equal footing with regards to mathematics achievement. As gender does not significantly affect mathematics achievement, teachers need not differentiate their mode of instruction or instructional materials but should provide equal opportunities for all pupils to participate in activities in and out of the classroom. The findings strike out the

stereotype that mathematics is for one gender. Parents need to be enlightened about this so that they in turn can encourage both male and female children to actively engage in mathematics.

5.3 Recommendations

Based on the findings, it is recommended that

- 1) the ministry and boards of education design curriculums that are non-gender based in order to bring about uniformity in the way teaching and learning takes place.
- 2) That teachers be made aware of the results of such studies in order to teach using gender-balanced methods.

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